

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

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Federal Communications Commission  
Office of Secretary

IB Docket No. 96-132

In the Matter of )

Establishing Rules and Policies for the )

Use of Spectrum for Mobile Satellite )

Service in the Upper and Lower L-band )

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REPLY COMMENTS OF  
AMSC SUBSIDIARY CORPORATION

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Bruce D. Jacobs  
Glenn S. Richards  
Robert L. Galbreath  
Stephen J. Berman  
Fisher Wayland Cooper Leader  
& Zaragoza L.L.P.  
2001 Pennsylvania Ave., N.W.  
Suite 400  
Washington, D.C. 20006  
(202) 659-3494

Lon C. Levin  
Vice President and Regulatory Counsel  
AMSC Subsidiary Corporation  
10802 Parkridge Boulevard  
Reston, Virginia 22091  
(703) 758-6000

Dated: October 7, 1996

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## Summary

AMSC continues to strongly support the Commission's proposal to assign the first 28 MHz of MSS L-band spectrum to AMSC, using whatever frequencies in the upper and lower portions of the band can most effectively be negotiated in the international frequency coordination process. The rationale for the Commission's proposal is that the lower portion of the band is needed for successful coordination of the U.S. MSS system and that AMSC is uniquely positioned to use the lower MSS L-band spectrum to provide MSS to the public expeditiously, since it has already constructed and launched its first satellite and there is so little spectrum available.

None of the comments even attempts to discredit the fundamental rationale of the Commission's proposal, that the lower portion of the band is needed for the U.S. system to gain access to the minimum 20 MHz identified by the Commission as essential for its viability and relied on in the development of the U.S. MSS system. The recent Mexico City coordination agreement confirms the Commission's assessment.

Nor do any of the comments challenge the Commission's finding that AMSC is in a unique position to use the spectrum to provide service in the United States. There are challenges to AMSC's need for as much spectrum as the Commission assigned to it, but as the Commission recognizes in its *NPRM*, it is critical to the development of new services such as MSS that there be a stable regulatory environment. There are also challenges to AMSC's spectrum efficiency, but as discussed in the Technical Appendix, such challenges are based on highly exaggerated claims for new technology. And, in any event, none of the comments makes a showing that there is another U.S. system that can use the lower portion of the L-band in the foreseeable future. In

light of all the opportunities that the Commission has provided for such a showing, it is now abundantly clear that the Commission is right: the only practical way to put the lower L-band to use to provide service to the U.S. public is to permit the spectrum to be used by AMSC's system.

Some of the comments continue to challenge the Commission's processes for modifying the U.S. MSS system's license, but it is apparent that by this stage in the process, nearly seven years after AMSC first proposed to operate in the lower portion of the band, the relevant information is available and the Commission has accorded all interested parties ample notice and an opportunity to comment.

One of the Big LEO licensees also continues to raise speculative concerns about the potential for interference from lower L-band operation to its proposed system. As the Commission has responded previously to such concerns, however, it is premature for the Commission to conclude that interference will actually be a problem, particularly since AMSC will operate in accordance with established Commission technical rules. Moreover, the Big LEO licensees should be on notice that their systems will need to be sufficiently robust to contend with the global use of the lower portion of the MSS L-band.

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**Before the  
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Washington, D.C. 20554**

In the Matter of )  
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Establishing Rules and Policies for the ) IB Docket No. 96-132  
Use of Spectrum for Mobile Satellite )  
Service in the Upper and Lower L-band )

**REPLY COMMENTS OF  
AMSC SUBSIDIARY CORPORATION**

AMSC Subsidiary Corporation ("AMSC") hereby submits its reply comments in support of the Commission's Notice of Proposed Rulemaking in the above-referenced matter. FCC 96-259 (June 18, 1996) (the "*NPRM*").<sup>1/</sup> AMSC continues to strongly support the Commission's proposal to assign the first 28 MHz of MSS L-band spectrum to AMSC, using whatever frequencies in the upper and lower portions of the band can most effectively be negotiated in the international frequency coordination process.<sup>2/</sup>

**Background**

*The NPRM.* The *NPRM* proposes to modify AMSC's license from one that designates

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<sup>1/</sup> Comments were filed by the following parties: Celsat America, Inc. ("Celsat"); Comsat Corporation ("Comsat"); Lockheed Martin Corporation ("Lockheed Martin"); L/Q Licensee, Inc. ("LQL"); Motorola Satellite Communications, Inc. and Iridium LLC ("MSCI/Iridium"); Radio Satellite Corporation ("RSC"); and the Rural Telecommunications Group ("RTG"); and United States Coast Guard ("Coast Guard"). LQL, MSCI/Iridium, and RSC also styled their filings as "oppositions" to the proposed modification of AMSC's license.

<sup>2/</sup> The *NPRM* also addresses the provision of priority and preemptive access for maritime distress and safety communications in the lower L-band. *NPRM*, paras. 25-27. Both AMSC and the Coast Guard submitted comments on this set of issues. Without agreeing with everything in the Coast Guard comments, AMSC acknowledges the importance of the Coast Guard's concerns and is committed to addressing them in every practical way possible. AMSC and the Coast Guard are continuing to discuss these matters and will keep the Commission informed of those discussions.

28 MHz of L-band spectrum in only the upper portion of the band to one that designates the same total of 28 MHz of spectrum, but draws from either the upper or lower L-band in any combination of frequencies, as determined by international frequency coordination. This proposal is based on the fact that the dynamics of international frequency coordination have changed since the Commission initially awarded AMSC its license. From the time when the Commission began examining the use of the L-band for MSS in 1983, continuing through to when it first assigned AMSC 28 MHz of spectrum, the upper L-band was completely unused and largely unclaimed, while the lower L-band was widely used by Inmarsat. Since then, however, several administrations have attempted to coordinate systems in both the upper and lower L-bands and both Inmarsat and the Canadian MSS system have completed construction of their systems and begun operation. All of the administrations engaged in the coordination, except the United States, do not limit their systems' access to either the lower or upper portion of the L-band. The United States, therefore, is at a disadvantage in negotiations for the U.S. system, unless it modifies AMSC's authorization to permit it to use both portions of the band.

Thus, the fundamental rationale for the Commission's proposal is that the lower L-band is needed for successful coordination of the U.S. MSS system, with success defined as providing the U.S. system with access to at least as much spectrum (20 MHz) as the Commission indicated was its minimal requirement at the time of licensing and no more spectrum than the Commission initially assigned to AMSC (28 MHz). In the *NPRM*, the Commission finds it to be unlikely that the U.S. would be able to coordinate access to more than 10 or 12 MHz in the upper L-band alone. *NPRM*, para. 9. The Commission also finds it to be unlikely that it will be able to coordinate more than 10 MHz in the lower L-band and

states that this does not appear to be sufficient spectrum to license a second system. *NPRM*, para. 10. If commenters disagree, the Commission asks them to address “the presence of Inmarsat and three other geostationary MSS systems in the lower L-band and the likelihood that geostationary satellites will continue to occupy this portion of the spectrum for the foreseeable future.” *Id.*

To the extent that the U.S. would be able to coordinate access to more than 28 MHz in both portions of the L-band, the Commission proposes to hold open the possibility of using the additional spectrum for another MSS system. *NPRM*, para. 1. Specifically, the Commission characterizes its proposed policy as giving AMSC access to the lower L-band “only as necessary to compensate for the loss of upper L-band spectrum currently assigned to it.” *NPRM*, para. 11.

The Commission finds AMSC to be uniquely positioned to use the lower L-band spectrum to provide MSS to the public expeditiously, since it has already constructed and launched its first satellite. The Commission notes the importance to the public interest of supporting the commitment that AMSC has made:

If AMSC, through no fault of its own, obtains insufficient spectrum for its system, its service will be jeopardized, and no other potential licensee in the lower L-band will be able to provide service for years. AMSC’s substantial progress toward full implementation thus figures heavily in our public interest analysis, quite apart from the hardship AMSC would suffer if it were unable to recoup its investment of money, time, and other resources.

*NPRM*, para. 13.

The Commission also bases its proposal on the public interest need to stand behind the commitment that the Commission made in assigning spectrum to AMSC:



while all satellite licensees are granted subject to the uncertainties of international coordinations, the public interest requires that a Commission license carry with it some reasonable expectation that it will permit the holder to implement its system. Otherwise, applicants and licensees -- as well as their investors and potential customers -- may be unwilling to commit the significant resources necessary to implement proposed systems, and this will have a chilling effect on the introduction of new services to the public.

*Id.*, para. 14.

In proposing to modify AMSC's license to include both portions of the MSS L-band, the Commission finds that by issuing this further notice, it moots concerns about inadequate notice that had been raised in response to AMSC's 1993 amendment. *NPRM*, para. 19. The Commission also finds that it has sufficient legal authority under Sections 303(r), 4(i), and 316 of the Communications Act to take the actions proposed. *NPRM*, para. 23-24.

The Commission dismisses concerns raised by two Big LEO MSS licensees, Loral Qualcomm Satellite Services, Inc. ("LQSS")<sup>3/</sup> and MSCI. The Commission disagrees with the argument made by LQSS that the Commission should use the lower L-band spectrum to license additional systems with global coverage, instead finding that "[i]t would not serve the public interest to license multiple U.S. systems in a frequency band in which there is insufficient available spectrum" and that a domestic MSS system would provide useful services to the U.S. population. *NPRM*, para. 20.

The Commission also dismisses concerns raised by MSCI that out-of-band emissions from AMSC terminals operating in the lower L-band would degrade the service that its Iridium system could offer. The Commission indicates that such concerns are premature at

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<sup>3/</sup> LQSS is the predecessor in interest to LQL, which filed comments in response to the *NPRM*.

this time, prior to either international frequency coordination (which will determine what spectrum AMSC will access in the lower L-band) or any efforts by MSCI and AMSC to attempt to resolve adjacent band interference concerns between themselves. *NPRM*, para. 21. The Commission further notes that there are other satellite systems operating or proposed to operate in the lower L-band, including Inmarsat, Canada, Mexico, Australia, and the Russian Federation, all of which may use terminals having out-of-band emission characteristics similar to those of AMSC. *Id.* Thus, if a problem is raised by AMSC's operations in the lower L-band, Iridium will suffer similar problems around the world.

*The Comments.* The Commission's proposal to modify AMSC's license was opposed by a number of parties, virtually all of which are competitors or potential competitors of AMSC.<sup>4/</sup> None of the comments said anything to discredit the fundamental rationale of the Commission's proposal, that the lower L-band is needed for successful coordination of the U.S. MSS system. Some of the comments, however, question the impact of the recent Mexico City coordination agreement. None of the comments challenge the Commission's finding that AMSC, with its system already in place and operational, is in a unique position to use the lower L-band spectrum to provide service in the United States. Nor did any of the comments

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<sup>4/</sup> Comsat Corp. is unique in its support for the Commission's decision. Most of Comsat's comments, however, are devoted to reiterating its support for the use of Inmarsat space segment to provide U.S. domestic service. As AMSC has indicated previously, given the severe shortage of L-band spectrum, which is likely to continue for the foreseeable future, the use of foreign space segment to provide domestic service would have a substantial and adverse impact on securing spectrum for the U.S. MSS system. *See, e.g.* AMSC Petition to Deny Comsat Planet 1 application, File No. 1281-DSE-P/L-96 (July 12, 1996). This situation has not been changed by the Mexico City agreement. *See* AMSC Reply Comments in CC Docket 87-75, pp. 3-5 (October 4, 1996).

demonstrate an ability to use only a few megahertz of spectrum in the lower L-band to develop a new MSS system. Some comments, however, challenge AMSC's need for the amount of spectrum that the Commission assigned to it in its license. Some of the comments also challenge the Commission's authority to proceed with the modification of AMSC's license. One of the Big LEO licensees also continues to raise concerns regarding interference to its system.

### **Discussion**

#### **I. The status of international frequency coordination justifies the proposed modification of AMSC's license**

The status of international frequency coordination is critical to the logic of the Commission's proposal. Several of the comments, however, suggest that the recently-concluded Mexico City coordination agreement provides a solution to the problem that underlies the Commission's proposed modification of AMSC's license. *See, e.g.* Comments of Celsat; Comments of LQL. In fact, the Mexico City agreement confirms the need for the U.S. system to access both portions of the MSS L-band. As the Commission predicted in the *NPRM*, the U.S. was only able in the Mexico City agreement to negotiate for access to less than 10 MHz in the upper L-band. Moreover, the Mexico City agreement covers only the period through 1997. AMSC anticipates that future coordinations will continue to be contentious. Unsuccessful efforts in Mexico City to negotiate a coordination agreement covering the period through 1998 highlight the extent to which stated demand exceeds the available spectrum. Moreover, the factors that are to be used in future negotiations are not fully defined and there is always the possibility that new MSS systems will be proposed to

operate in these bands that would require coordination with the U.S. system.

## **II. AMSC needs the amount of spectrum the Commission has assigned to it**

As AMSC noted in its comments, access to sufficient spectrum is a critical element in the development and success of a wireless communications system, and the U.S. MSS system is no exception. AMSC built its business plan on the Commission's license, which assigned AMSC 28 MHz of mobile-link spectrum in what was then an unused and largely unclaimed band, and recognized the system's need for access to a minimum of 20 MHz.

Several of the comments argue that AMSC does not need as much spectrum as the Commission initially assigned to it and that the spectrum should be used instead to license additional systems. *See* Comments of Celsat;<sup>5/</sup> Lockheed Martin; LQL; MSCI/Iridium; and RSC<sup>6/</sup>

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<sup>5/</sup> Celsat also argues that AMSC should be precluded from eligibility for any spectrum allocated to MSS in the 2 GHz band. Celsat's proposal is not germane to this proceeding. Further, the Commission has previously rejected the placement of spectrum caps on MSS. *See* Third Report & Order, Gen. Docket 93-252, 9 FCC Rcd 7988, 8112 (1994). AMSC has been a leading proponent domestically and internationally for the allocation of sufficient spectrum for MSS, including the 2 GHz bands, an effort of which Celsat has been a beneficiary.

<sup>6/</sup> Although it is not relevant to this proceeding, RSC alleges that AMSC refused to provide it with satellite capacity for an audio service that RSC proposed to offer. AMSC disputes RSC's allegations. AMSC supported RSC's application to provide an audio service. AMSC was and remains willing, as a common carrier, to provide capacity to RSC on the same terms and conditions available to others. The only requests for service ever made by RSC to AMSC, however, were for large amounts of capacity at steeply discounted rates, and RSC made those requests years before AMSC had designed its satellite and established its own cost structure. AMSC responded to those requests the only way it reasonably could: by stating that capacity would be available for RSC in the future, at reasonable rates to be determined when AMSC's own development was further along. RSC's contention that AMSC interfered with its attempt to obtain capacity on the Canadian MSS satellite is false. Moreover, what RSC contemplated was using the

*AMSC's securities filings.* Celsat argues that AMSC's securities filings indicate that AMSC has never expected and never needed access to more than 20 MHz. Celsat, however, misreads AMSC's securities filings. The filings show AMSC's view that it could build a business based on access to a minimum of 20 MHz, not that this was the most spectrum that investors could expect AMSC to access. For instance, the prospectus states AMSC's belief that "the U.S. government will succeed in securing access for the Company to approximately 20 MHz of L-band spectrum" for the first satellite. Prospectus of American Mobile Satellite Corporation, p. 13 (December 13, 1993). AMSC also stated its belief that access to this 20 MHz of spectrum "is sufficient for the operation of the Company's first Satellite." *Id.* There are also illustrative revenue projections contained in the prospectus that are based on several assumptions, including access to a minimum of 20 MHz. *Id.*, pp. 40-41. Read in the context of a securities filing, these statements do not indicate that AMSC has no need for more than 20 MHz or that AMSC has ever had an expectation that it would be legally limited to 20 MHz.<sup>2/</sup>

Indeed, if Celsat had read further, it would have noted the importance that AMSC has always attached to accessing the lower L-band. Specifically with reference to the lower L-band,

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Canadian satellite to broadcast into the United States, which would have been a violation of U.S. law.

<sup>2/</sup> The Commission has recognized previously that securities filings must be read in context. See, e.g. Memorandum Opinion and Order, FCC 96-279, 1996 FCC LEXIS 3410, paras. 22-24 (June 27, 1996), citing MMM Holdings, Inc., 4 F.C.C. Rcd. 8243, 8250-51 n.15 (1989) ("risk factor analyses in stock prospectuses, which intentionally provide worst-case financial projections, are not admissions that such worst-case scenarios will develop").

the filing said the following, all of which remains essentially accurate:

The Company has filed an application with the FCC to operate the Satellite using an additional 28 MHz of L-band frequencies adjacent to those already assigned to the Company by the FCC (the "lower L-band"). Certain entities have filed with the FCC petitions to deny the Company's application and comments opposing the assignment of additional frequencies to the Company, but the Company believes that there are several reasons why the agency will grant the Company's application. The Company's belief is based primarily on there being an inadequate amount of spectrum available in the lower L-band to justify the FCC licensing another satellite system to use the frequencies, since Inmarsat already is operating a satellite system using a substantial portion of the 28 MHz of lower L-band spectrum and the remaining spectrum must be shared with the three other countries proposing new satellite systems. The Company is unique in its ability to use even a relatively small amount of the 28 MHz efficiently by combining the new frequencies with those that the FCC already has assigned to it and quickly implementing the use of all the available spectrum. Another factor favoring the assignment of the lower L-band to the Company is that the Company may need access to these additional frequencies in order to obtain access to the 20 MHz of spectrum that is the stated goal of U.S. coordination efforts. In addition, the entities that have opposed the assignment of the additional lower L-band frequencies to the Company are proponents of satellite systems that use non-geosynchronous satellites and the additional frequencies are not suitable for use by such systems.

Prospectus, pp. 45-46.

*Spectrum efficiency.* Lockheed Martin argues that new MSS systems are more spectrum efficient, citing the ACeS satellite system that it is building. Comments of Lockheed Martin, pp. 7-10. According to Lockheed Martin, its ACeS system is capable of 20 times frequency reuse and 3 kbps voice circuits, and is able to use blocks of non-contiguous spectrum as small as 200 kHz. Lockheed Martin argues that AMSC could use new ground segment technologies to enhance its efficiency, but that it has no motivation to do so in light of the Commission's proposal.

Lockheed Martin's characterizations are highly inaccurate and exaggerated. As discussed in the attached Technical Appendix, the frequency reuse that it claims is completely

unrealistic at least for a system operating in the United States. As Lockheed Martin should know, theoretical reuse, which assumes an even geographic distribution of traffic, is meaningless; what counts is actual reuse based on the actual distribution of traffic. AMSC's studies indicate that the most realistic estimates for a multiple-beam satellite such as ACeS (which costs roughly twice as much as AMSC's first satellite) would be nowhere near the 20 times reuse that Lockheed Martin claims, but rather would be closer to three times reuse.

Lockheed Martin similarly exaggerates the efficiency gains that can be achieved with the use of newer vocoders. As discussed in the Technical Appendix, newer vocoders are more likely to result in improvements of only approximately 20 percent. Finally, Lockheed Martin mischaracterizes how relatively easy it would be to coordinate an ACeS-type satellite. AMSC has been able to coordinate spectrum blocks as small as 47 kHz, which are even smaller than those Lockheed Martin claims can be coordinated for use by its ACeS satellite.

Several of the comments point to the licensing of Big LEO MSS systems with less than 20 MHz of spectrum. One key difference, however, is that these are global systems, which will use their spectrum around the world. In addition, it is not apparent that the Big LEO systems will have access to substantially less spectrum than the Commission has assigned to AMSC. At this time, there are only three systems that have been licensed to share the 33 MHz of spectrum, and only two of those systems (Globalstar and Iridium) appear to be under construction.

Thus, in short, while improvements are constantly being made in satellite and mobile radio technology, improvements made since AMSC designed and built its first generation

system have not radically altered the amount of spectrum needed for system viability.<sup>8/</sup>

*Availability of sufficient spectrum for an additional system.* None of the comments that argue for the licensing of an additional system address specifically the issue the Commission requested they address: the presence of Inmarsat and three other geostationary MSS systems in the lower L-band and the likelihood that geostationary satellites will continue to occupy this portion of the spectrum for the foreseeable future. *NPRM*, para. 10. MSC/Iridium claims that it would file an application if it was given an opportunity to do so, but despite repeated opportunities, it has failed to demonstrate that it could operate a system in the band.

MSC/Iridium states repeatedly in its comments that it has an agreement with AMSC

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<sup>8/</sup> AMSC will use the lower L-band spectrum efficiently. As AMSC noted in its comments, it uses extremely efficient 6 kHz voice channels for its Skycell service. AMSC is also able to increase its spectrum efficiency by reusing the same spectrum in its Central and Alaska/Hawaii beams. In contrast, Inmarsat requires 25-50 kHz channels for its Standard A service, 20 kHz channels for Standard B service, and 10 kHz channels for Standard M service. In addition, Inmarsat Standard A service requires the use of global beams, which reduce geographically-based spectrum reuse and sharing.

It is important to note that Lockheed Martin never specifically states: (i) how much spectrum is sufficient for the ACeS system; (ii) that there is enough spectrum in the lower L-band for it to file its own application to construct and launch a U.S. MSS system or (iii) how much spectrum there would need to be for it to file such an application.

Lockheed Martin also requests permission to participate in future coordination negotiations, arguing that AMSC would not be motivated to fight for "a single kHz" more than it can get for itself. Comments of Lockheed Martin, p. 16. AMSC strongly opposes this request. First, it misstates the nature of the coordination by suggesting that it is conducted by AMSC; in fact, the coordination is conducted by the U.S. government, with AMSC as the licensee serving merely as an advisor. Second, it is the reasonable practice of the government to limit participation in coordination to entities that have been licensed by the Commission. See Tentative Decision in Gen. Docket No. 84-1234, 6 FCC Rcd 4900, paras. 36-43 (1991).



that AMSC will not operate in the lower L-band below 1631.5 MHz. These statements seriously misrepresent the actual facts. As is plain from the letter that MSCI cites as authority for its "agreement," AMSC has agreed, in the context of an application to operate certain mobile terminals, only to inform MSCI if the out-of-band emissions of its terminals are expected to change. See Letter of Philip L. Malet to William F. Caton (June 28, 1995). Although AMSC's first satellite does not operate in the 5 MHz of the lower L-band that MSCI/Iridium discusses, this spectrum is nonetheless a key part of the international frequency coordination process. If the Commission were to license MSCI/Iridium to operate on these frequencies, it would have a serious adverse effect on the overall MSS L-band coordination.

*Auctions.* RTG urges the Commission to use an auction to license the lower L-band spectrum. AMSC, along with virtually all of the U.S. satellite industry, is strongly opposed to the use of auctions to license satellite spectrum.<sup>2/</sup>

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<sup>2/</sup> See "Public Harms Unique to Satellite Spectrum Auctions," a study prepared by Strategic Policy Research for the Satellite Industry Association (March 18, 1996) The SPR study made the following points about the adverse consequences of satellite spectrum auctions: (i) satellite operators are likely to face sequential auctions as one country or region after another conducts its own auction or imposes auction-based fees for the right to operate in its territory; these sequential auctions will add incalculable cost and risk to deployment of new satellite systems and are likely to lead to extortion of U.S. satellite companies by foreign governments; (ii) as an alternative to sequential auctions, countries may push for increased *a priori* planning of satellite spectrum or for global auctions; *a priori* planning would result in inefficient use of the spectrum/orbit resource and reduce the U.S. government's leadership role; (iii) revenues that other countries would collect from auctions or from charging auction-based fees are likely to be several times larger than whatever auction revenue is collected by the U.S. Treasury; this means a huge outflow of U.S. dollars and a net loss to the U.S. Treasury; (iv) to avoid the threat of U.S. auctions, U.S. satellite operators may look to foreign administrations for sponsorship, which will lead to the U.S. ceding regulatory and policy leadership to other administrations or to the ITU; (v) the cumulative effect of auctions is likely to be a significant reduction in the deployment of new regional and global satellite systems that would otherwise produce

**III. The Commission has sufficient authority to modify AMSC's license as proposed**

LQL challenges the Commission's legal authority to modify AMSC's license, claiming that Section 316 is inapplicable, because "AMSC's authorization does not encompass an unconditional right to operate in the lower L-band." Comments of LQL, p. 15, citing *P&R Temmer v. FCC*, 743 F.2d 926-28 (D.C.Cir. 1984) and *Music Broadcasting Co. v. FCC*, 217 F.2d 339, 342 (D.C.Cir. 1954). The unconditional right that the Commission is modifying, however, is not AMSC's right to use the lower L-band, but rather the assignment of specific frequencies to AMSC. The Commission initially granted AMSC the right to use the upper L-band frequencies, subject to such things as international frequency coordination and the provision of priority and preemptive access to aviation safety communications. The Commission is now proposing to modify that authority to include new frequencies, a rulemaking function for which Section 316 is clearly appropriate.

The aspect of Section 316 that was at issue in the cases cited by LQL is the provision that requires Commission notice to the holder of the license if its license is to be modified. In those cases, the court found that it was not a modification of a license to enforce conditions that were part of the license. In this case, AMSC is not questioning whether the Commission's proposal is a modification of its license, and no enforcement action is involved.

LQL and MSCI/Iridium continue to complain of the impropriety of the Commission's having accepted AMSC's modification application for filing in 1993. As the Commission has

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tens of thousands of high-paying U.S. jobs and billions of dollars in U.S. exports; and (vi) any use of auctions for satellite licenses will undermine the historically successful ability of the Commission to find ways to accommodate reasonable satellite applicants.

pointed out, however, these concerns are now moot, since the Commission has proposed to act by rulemaking, rather than acting on AMSC's application. *NPRM*, para. 19. At this point, LQL and MSCI/Iridium cannot complain that they have not had ample opportunity to provide input on the Commission's decision. They both had an opportunity to comment on AMSC's application and they now have had an opportunity to comment on the Commission's Notice of Proposed Rulemaking. If either of them had a genuine interest in applying to operate in these bands, they could have submitted a showing to that effect. That neither chose to do so speaks volumes. At this point, the Commission can conclude with confidence that its initial judgment was correct: non-geostationary systems cannot operate in the lower L-band.<sup>10/</sup>

RTG, a self-proclaimed representative of unidentified entities, argues that Section 603 of the Regulatory Flexibility Act, 5 U.S.C. § 603 (1996), obligates the Commission to consider the effects of its proposal on rural telecom providers, and that, in its view, the modification of AMSC's license would have an adverse impact on such entities. RTG

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<sup>10/</sup> LQL and MSCI/Iridium have also had ample opportunity to persuade the Commission of their concerns about interference from AMSC's operations in the lower L-band. Although LQL complains that it needs to see a specific written application to understand the technical parameters of AMSC's system, those technical parameters are already on file, in AMSC's applications for space segment and for ground segment. All of these applications identified the relevant transmission characteristics of AMSC facilities and those used by its customers. Thus, LQL has had ample notice and opportunity to comment on any interference concerns that it may have.

Neither LQL nor MSCI/Iridium makes any attempt to explain the inconsistency between (i) their claims (albeit idle) that they could use the lower L-band for non-geostationary satellite systems and (ii) their claims both that the closer their systems get to geostationary satellite systems operating in the lower portion of the band, the more vulnerable their systems become to harmful interference and that the 1610-1626.5/2483.5-2500 MHz band needs to be reserved exclusively for non-geostationary systems. Clearly, they cannot have it both ways.

misreads the statute, which applies generally to small businesses and not specifically to rural telecommunications providers. Nonetheless, the Commission's analysis in the *NPRM* (para. 29), that no small entities would be adversely affected by its proposal, is equally valid for rural telecom providers that are small businesses. AMSC's MSS system will provide a valuable new resource for rural communications, particularly in areas that are presently unserved by terrestrial wired or wireless systems. RTG provides no evidence to the contrary. It certainly does not demonstrate that assigning lower L-band spectrum to AMSC will cause these businesses any economic harm.

#### **IV. The interference concerns raised by LQL should be dismissed**

LQL continues to press the Commission to restrict operation of MSS in the lower L-band on the grounds that such restrictions are needed to protect its Globalstar Big LEO MSS system. The Globalstar system, if it is built and launched, is to operate at least initially at 1610-1622.6 MHz and may, if MSC/Iridium's system is not launched, operate at 1610-1626.5 MHz. LQL claims that any authorization issued for operation in the lower L-band must be conditioned on not causing harmful interference to Globalstar, citing what LQL claims is a longstanding principle of "first in time, first in right."

As discussed in the Technical Appendix, LQL any interference would not be as bad as LQL claims. In any event, AMSC's operations in the band would comport with accepted Commission regulations for out-of-band emissions. *See* Section 25.202(f). As the Commission ruled in response to similar concerns raised in connection with AMSC's operation of half-duplex terminals in the lower L-band, the Commission's rules already contain the relevant limits. When LQL designed its system, it should have been aware of the

potential for interference from systems complying with these limits.

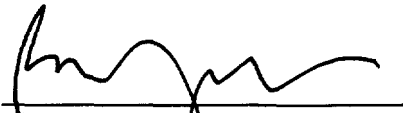
Moreover, as the Commission stated in response to MSCI's interference concerns in an earlier stage of this proceeding, if AMSC presents a problem for LQL's system, then it is reasonable to expect that similar problems will exist with the many other MSS systems that have or may have in the near future in-orbit L-band MSS systems.

### **Conclusion**


Therefore, based on the foregoing, AMSC urges the Commission to assign the additional lower L-band spectrum to AMSC.

Respectfully submitted,

**AMSC SUBSIDIARY  
CORPORATION**



Bruce D. Jacobs  
Glenn S. Richards  
Robert L. Galbreath  
Stephen J. Berman  
Fisher Wayland Cooper Leader  
& Zaragoza L.L.P.  
2001 Pennsylvania Ave., N.W.  
Suite 400  
Washington, D.C. 20006  
(202) 659-3494



Lon C. Levin  
Vice President and Regulatory Counsel  
AMSC Subsidiary Corporation  
10802 Parkridge Boulevard  
Reston, Virginia 22091  
(703) 758-6000

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## TECHNICAL APPENDIX

## Technical Appendix

### Response to Lockheed Martin

*Use of spot beams.* Lockheed points to the ACeS system as a far more efficient MSS system that is under construction. They maintain that the system will have a frequency reuse factor of 20. While a cellular type system with relatively narrow beams and a 7-cell reuse pattern can be more efficient than systems with broader beams, reuse is also limited by the geographical user distribution. At one extreme, if users are uniformly distributed over the satellite coverage area, the maximum reuse may be obtained. At the other extreme, if all users were concentrated in one cluster of cells, there would be no reuse. Real user distributions will be somewhere between the extremes and reuse will be as well.

AMSC has analyzed reuse potential for a U.S. system, assuming a satellite that would have approximately 70 beams covering the U.S., using a 7-cell reuse pattern. Using various user distribution models based on 1990 census data, we found that reuse would fall between 3 and 5, since there are vast differences in population density across the United States, with the more realistic projection closer to 3 times reuse. There is no reason to believe that the user distribution in the coverage area of an ACeS satellite would be more uniform than in the United States. No one, including Lockheed, has operated a MSS satellite with the large numbers of beams now under consideration. We believe that as their analysis proceeds, they will also determine that the reuse that can be achieved under actual conditions is much lower than the optimal theoretical values that Lockheed would use as a benchmark.

*Vocoders.* Lockheed points out that vocoders are under development that could operate at 3 kbps per voice circuit and that AMSC should justify not using these vocoders to cut spectrum usage in half. AMSC is examining these vocoders and considering them for use in our system. However, claims that spectrum usage could thus be halved are unduly optimistic. In addition to

vocoder data rate, such factors as error correction coding, frequency uncertainties, voice quality, and modulation technique also affect spectrum usage. Because of these considerations, AMSC has found that small reductions in spectrum requirements may be possible, but not of the magnitude that Lockheed suggests. Also, these vocoders have not been proven to the point where they could supplant all existing vocoders without a careful evaluation and a transition period. AMSC also provides data communications services that do not benefit from voice compression technology.

*Use of small band segments.* Lockheed erroneously implies that AMSC requires spectrum in 3.5 MHz or 4.5 MHz contiguous segments. Comments, p. 9, n. 23. In fact, under the present coordination agreement, AMSC will use segments as small as 47 kHz, in contrast with Lockheed's stated requirement for 200 kHz segments.

*Overall spectrum efficiency.* Finally, AMSC's efficiency is similar to, or better than, that of the other L-band systems covered under the coordination. Far from being outdated, AMSC's system is state-of-the art for operational MSS systems. While future systems may advance the art, AMSC's system is available now to economically support applications, including maritime safety in the lower L-band.

#### **L/Q Licensee**

*Use of the lower L-band by another system.* It is highly improbable that another satellite system could use the spectrum globally. The lower L-band will be fragmented and heavily used by others in various parts of the world. L-band systems include those of TMI in Canada, Telecomm in Mexico, Inmarsat, Russia, ACeS, APMT, Agrani plus others likely to emerge. LEOs cannot operate co-frequency and co-coverage with GEOs, they would have to have exclusive world-wide spectrum, which just is not available. The alternative, also improbable, would be to coordinate a plan where a



system uses different frequency ranges in different regions to avoid interfering with incumbent systems. Among the difficulties in that approach is the problem of avoiding interference with the many diverse systems with different beam shapes, power densities, and protection requirements. The CDMA systems have the additional difficulty of coordinating spectrum in continuous blocks of 1.25 MHz or 2.5 MHz, depending on the licensee.

The CPM Report to WRC-95, Chapter 2, Section 1, Part A.2, provides a bar chart indicating the number of MSS networks for which the ITU had received coordination or notification information, as well as the number of systems advance published in various MSS bands. The bands 1525-1559 MHz and 1626.5-1660.5 MHz had the largest numbers by far. The chart indicates that as of July 1994, there were about 90 systems that have provided coordination or notification information, and about 40 more that have advance published. These numbers are indicative of the difficulty that can be expected in attempting to coordinate globally in these bands.

*Interference issues.* L/Q Licensee once again claims that operation of AMSC has the potential to produce in-band and out-of-band interference to Globalstar service. The in-band interference issue is a consequence of inadequate filtering in the Globalstar satellites. They claim that as few as 30 AMSC mobile terminals operating within a Globalstar beam and within a 1.23 MHz bandwidth will cause more than 6% delta T/T in their system. Their analysis reveals that any system that has mobiles transmitting in lower L-band has the potential to interfere with the Globalstar service. Certainly, there are other systems operating in or near North America, notably Inmarsat and the Canadian and Mexican MSS systems, that will be operating in Lower L-band with power densities equal to or greater than that of AMSC. Globally, there are other incumbent systems such as those of Australia and Russia that also operate in this band with power densities equal to or greater than those of AMSC. Therefore, it behooves LQL to build a system that can operate in the presence of operations in this band.